Notebook, N-Undated.2

This undated notebook was probably used sometime during the period 1901-1902. All entries are by Edison. The book contains notes and drawings regarding the technical details of cement production. Included are items pertaining to the temperature of the kiln in the roasting process and the degree of fineness needed in the ground cement rock. The pages are unnumbered. Approximately 170 pages have been used.

N-00-00-00.2

Burning Portland Cement -

It is stated by Expert of Lehigh Cement Co that they use 150 lbs of powdered bituminous coal per bbl of Portland Cement presumeably 400 lbs -

That the terminal temperature of gases leaving roasters is 600 deg Fahr If this is Correct. The Heat units with 7% ash 140 lbs Carbon would be

BHU 16,240,000

40 — 60

4000 lbs min
.16
32000
4000
72000

21%

5

18

35
17.5
52.5

720
60
43200

356

17.5
2
22

88
17
5)105
21

HU in Exit gases 540 deg
above the temp of atmosphere
60 Fahr is

2.467.000

Expulsion of CO_2 from CaO-

1.940.000

Radiation assumed as 350
or 290 above the atmosphere
from furnace & cylinder

1.074 000

HU in Clinker supposing it
leaves burner at 2000 Fahr

1.364.000

Decomposition of 19 lbs of water in air of combustion

133,000

Dehydration of Silica -

125 000 -

Heat of clinkering or semifusion - 1,500,000

HU in fuel 16 240 000

2 467 000

Exit gases 1 940 000

Explan CO2 1 074 000

Radiation 1 364 000

in Clinker 1 600 000

Clinkering 133 000

Water 125 000

Dehydrat 8703 000

16 240 000
8 703 000
Unaccounted for - 7,537,000

Either the Exit gases have a much higher temperature than stated or the temp of Cylinder is much higher than 350°, or the Coal is not burnt to CO_2 but to CO or there is a great excess of air which would give more Exit gases —

The analysis shews that the temp of exit gases must be low, that the C must be burnt to CO_2 with some excess of air to diminish vapor tension of CO_2 to permit Expulsion at low temp from Limestone —

That Regenerative device must be used on Clinker -

The Speed of the gases through 6 ft cylinder is 122 ft per minute which should not blow out fine grinding of the Limestone + Cement rock & thorough mixing is very important before going to roaster – as well as proportioning the rock to give no free Lime to slag the fire brick or hurt the Cement,

Note – Decompn of $CaCO_3$ starts at 440 C = 824 Fahr

If the pressure is kept below the limiting pressure or maximum Vapor tension the whole of the $CaCO_3$ is decomposed

28)85(3
84

28)520(18.5
28
240
224
160
140

36) inches 1000 (28 m to inch
72
280
288

Vapor pressure of CO_2 from $CaCO_3$
at 860 C or 1580 Fahr
is 85 mm (3 inches) of Mercury
at 1040 C or 1870 Fahr it
is 520 (18½ inches) mm of Mercury

Caustic Lime Combines with
incandescence with CO_2
at 550 C or 1022 Fahr
The Compound formed is
$(CaO)_2 CO_2$ This Compound is
capable of absorbing more CO_2.

23.8

2)75
37.5
3
112

23.8
17.8
6.0

23.8
3
1.4

4)17.80
4.45
13.35

778
67
1246
1068
5)11192.3
5963.0

238
25
1190
476
595.0

17.8
5
89.0

67 ton Crushing 6 sheaves
75 lbs — 17.8 %

with 9 sheaves in 50 lbs its
the same thing =
hence 67 ton 17.8 gives
gives 59.6 66lbs
100 tons with 17.8 gives 89 lbs—

112 lbs pressure give 23.8
75 17.8
6 difference

50% more pressure gave
only 25% more fines —
hence Reduction to 37.5 lbs
pressure should reduce it
certainly not less than 25%
or to 13.35 — The power
would be reduced from ~~75~~ HP to
35 —

hence 128 tons would go
through on 35 lbs pressure
gives 17.08 tons —

12/80(6.6
72
80

14
66
84
84
92.2

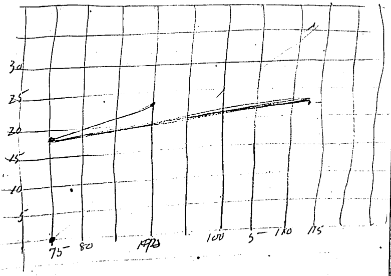
15
66
90
90
99.0

15 1/4"

1335
128
10680
2670
1335
17.080

80 66lbs

100
25



20% on 800 tons
16% with 1000 tons —
1/4 flake —

125
16
750
125
2000

79
50
395

40
2000
3) 80000
26666

Thompson

102. hour

2
48

Thompson

1200
12

1728) 10800 (6,2
10368
432

12
144
12

10800

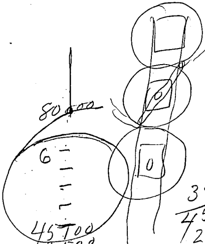
16)
16
128
128

110
62
220
660
6820

400) 40920 (102
400
920

16
60
96

960) 71400 = (74
6720
4200



4500
2500
2700
18

66240
2500
2700
71.44

30
54
120
108
540
648

96
470
672
384
4512
24
80
1925
9600

37
80
296

36
80
2885
14400
460
864
576
6624

6 75 Red

1728) 6480 (37
5184
12966
12096

Thompson

7400

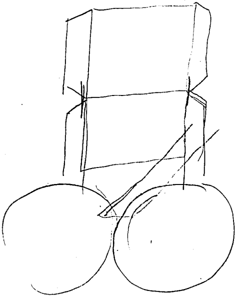
296
60
1776
1600
60
(4

Thompson

460
6
2760

16
16
96
16
2560
2048

204
50
1728) 10200 (6
10368



25
900
22500

9720
25
48600
19440
243000
8) 243000
30375
8
24296
125
1728) 182220 (105
1728
9420
8640

2240
125
11200
4480
2240
280000

105
130
3150
105
13650

3037
60
182220

90
9
810
12
1620
810
9720

16 100
1/8 - 200
1/4 - 400
1/2 800 - 60

9720
30
96) 291600 (3037
288
360
288
720
72

48) 1200 (25
96
240
240

2500
60
400) 150000 (375
1200
3000
2800
2000
2

1728) 3037 (1.7
1728
13090
12096

130
17
910
130
2210

170

230
60
13800

1.47-

490
493
100)147(147-   4)147
3.7-
1000
1/4-
47 0
4500   3/16
47

100-

.14   115
24   24
56   460
28 6   230
2761

96)2250(2 ft 3.4 min — 49)276(5.6
1920   245
338   310
288   243
420   3

49)72(1.47
49
236
196
343

3/16 = 3/16 =

234
130
7020
234
30460
2240)8252(81.4
17920
3320
2240
1080

5.6

5

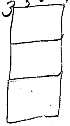
10-

3555
35
17775
10665
124425
2) 12442
6462212

62000 lb

79
576
448
5056
3160
4744
79
40
3160

4740
75
23700
33180
355551
3



pressure of
1 on 1
moves 003 -
3 moves 009
hence 3 times work
at same pressure.

20
30
600 -

3555

474
35
2370
1422
165900

1659
35
82952
4977
1659000 - lbs every 2 minutes

2) 58065
29032

39

28
3
84 - tons -

4) 2500
625
1875 -

2

50
18
400
400
5000
900

28
35
140
840 -
980

35
2000
60) 2000 (116 min -
600
1600
400
4

25

116
6
696
60
2240) 41760 (18
22400
19360

Air motor
Reheater & Drill —
Ortiz
Coal seperation
Fine coal burning
Meter
Storage batty
Marconi
Portland Cement

500 Kp

363
2
726

1200
100000
35000 | 12000000 | 363
99000000 | 125
21 | 488
1980000
1200000
1

600-

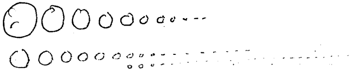
850 Kp

1/1200- | 100000

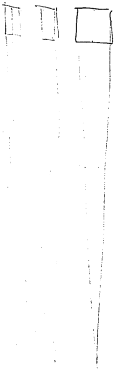
12000000

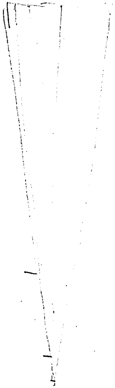
144
2
288

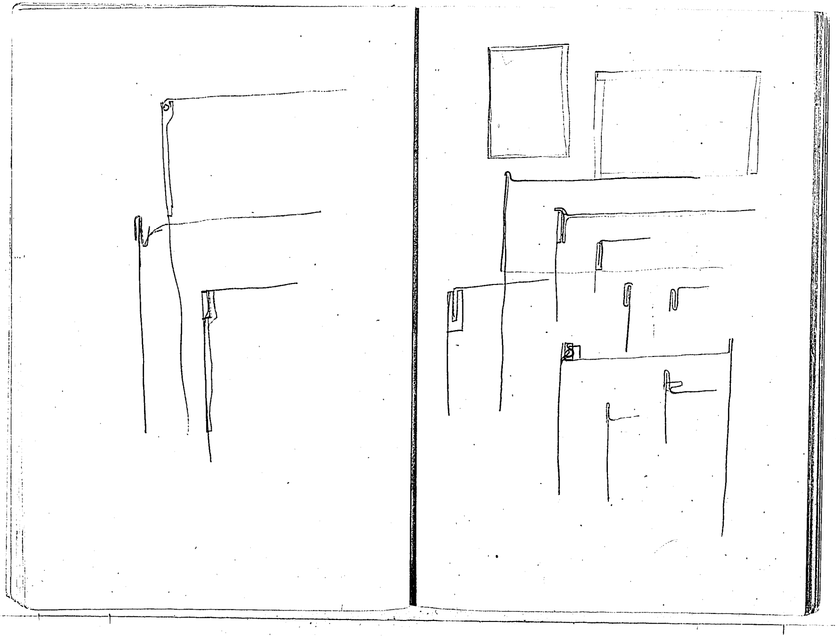
300
600

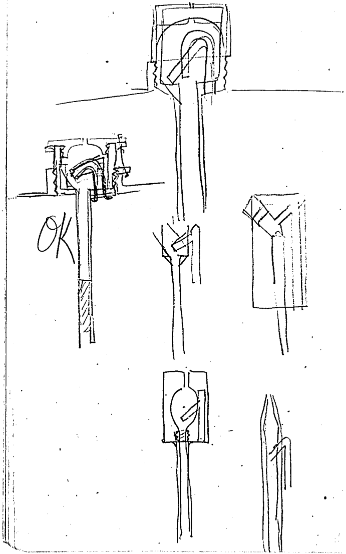


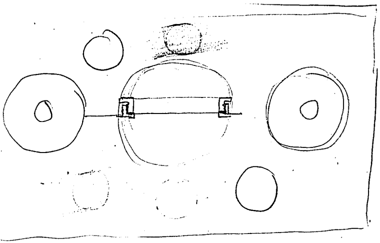
288/100000 (348
864
1362
1150
2080

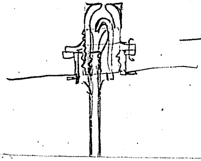


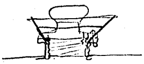


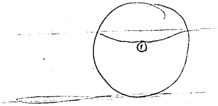



OK

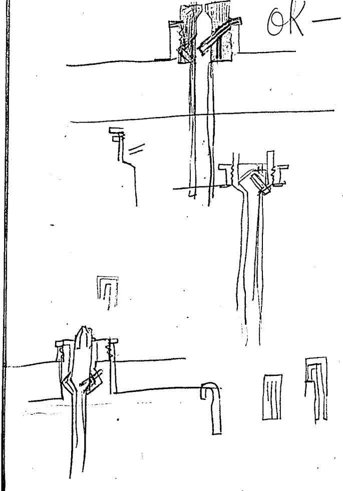




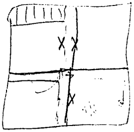


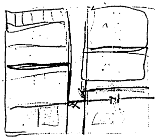


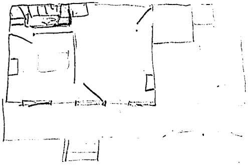
21 -
14
7

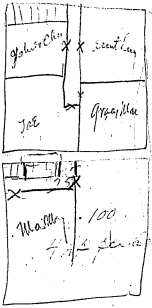


OK —



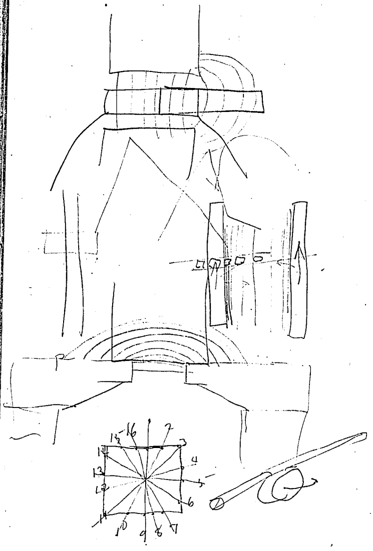


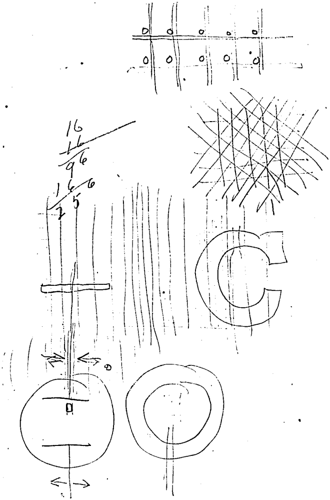


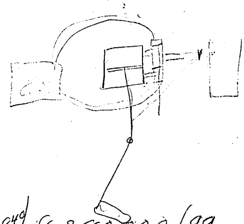

John Chin
Scent Lay
Joe
Greg Mac
25
Mastley
100
4 [illegible] per hour

1000 lbs 30 [illegible]

16-


16
2
3
4
5
6
7
8
9
10
11
12
13
14
15


16
16
96
1 6 6
2 5



83840) 8380000 (99
754560
83440

99 miles

Zinc 55 lbs – 15c
55 20
559400

825
1100
1925

75
20-

55
20
1100

279700
391580
419555

15
55
75
75
825

419000 net

55

444
300

1400

133260
79926
55944

1265

15

55
8
440
825
1265

1 cell 419000 net ft lbs –
20 cells –
8,380,000

55 40

80
20
8 | 1600 –
200 –

5240
16
3144
5240
8384

36) 2000 (55
180
200

HCl – fused $NaCl$, H_2SO_4

NH_4 – H_2SO_4

$CaCO_3$ —— Caustic K

CaO, CO_2. Perox Mn & Pb + H_2SO_4
giving CO_2 mixed with O –
thence through a heater to
Expansion Cylinder

If there was 32% fines
in the 67 Ton & all the
oog came through with it
There would be 34% on
200 mesh –
but not more than ½ will come
through while 3/4 of float
come through hence 27.8 on
200 mesh

lb
hence – 34
66 float

17
44
61 / 170 / 27
122 / 18
480
427
530

~~100~~
7900

28
180
2240
28
12 / 5040 / 3 / 66
42 / 22
348
2160
420
198000
120

9480
4200
18960
37920
120
14000
774
3981600
33000 / 3381600
56000
6600
98000
21980000
1083600000
1980000 / 99360000
9920000
979

5.4

79
120
158
79
9480

1.5
54
60
6
750
8.1

Total in 61. 009
" " 13 float
74

3.6% float in — 82.5 009
17.5 float —

17.1 of 009 —

Had there been
7.2% of float

70 009
30 — float

10.8 float. 61 009
39 float

with 14.4 float 54 000
46 float

25.2% 40 — 000
60

37
63 float

28%

~~18% float~~ —
34
66

48.4
51.6

32% float

21.6 float

44.9
56.1

13
4
52
61
113

113 (520 (46.
452
68
68
261

26
87 (260 (30
261

4
6100
3900
100) 390 (39
300
900

108
36
14.4

74 (130 (17.5
74
568
518
420

355) 610 (17.1
355
2555
2485
6.5

1.3
6
7.8
6.1
13.9 (780 (5.61
695
850
834
160

1000
175
825

1000
516
48.4

14.4
3.6
18.0
61
79

1000
561
44.9

355 (13000 (3.6
1065
2350
2180
220

1.3
5
6.5
6.1
12.6 (1000 (15.9,61
630
2000
2264
740

82.5 009
17.5 float —

70 — 009
30 float —

30.5 —
130
435 / 1300 (30
1305

12
104
61
165 (1040 (63
990
50

61
26 —
87 (260 (30
261

36
8
28.8

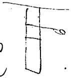
13
8
104
61
165 (1040 (

115 —

31
26
57 / 260 (4
228
322

45%

15
8
120
15
27 473
8



36
9
32.4

82.5 009
17.5 float

13 — 61
13
74 (130 (1.75
74
560
518
420

1000
175
825

90 — fine — of which .20% wanted go through
10% float —

10% float Comes through 10% of
the 20% — Result 50% on
200 mesh —
If 20% float + 10 pct come
through of the 20% comes
then 33% on 200 —
If 30% fine & 10% comes through
then 25% on 200 mesh

13
9
117
61
178 (1170 (66
1068
1020

36
7
252

13
7
91
61
152 (9100 (60
12

79
120
1580
79
9480 lbs 420 piston speed

7900
158
7742

.79
4
2) 3.16
1.58

28
180
224
28
12) 504 (420
48
24
24

9480
420
189600
37920
33000) 3981600 (120.6
33000
68160
66000
2160

.80
30
2400

80
160000
30
00

77.42

24000) 48000 (120 bbls
4000
800

80 Tons

7742
120
154840
7742
929040
420
185800
37160
33000) 3901800 (118
33000
60180
33000
271800
264000

118
36

2) 118
59
18
41

41

118
36

2) 118
59
118
1157
169

100
35
65%

169

65% ferric
3

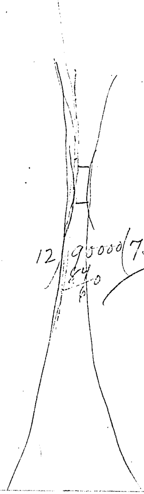
20. 1668.30 Sec

70
35
350
210
2450

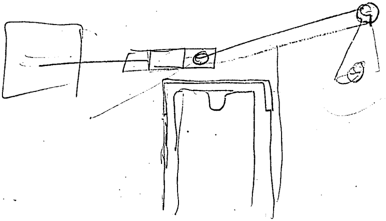
60
40
2400 -
70 -

355
26
2130
710
9230
92 grms

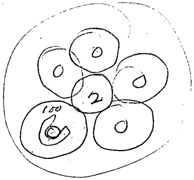
32
6400
26
384
128
1664
400) 1664 (4066 lbs
1600



12) 90000 (7500
84
60
60



1000



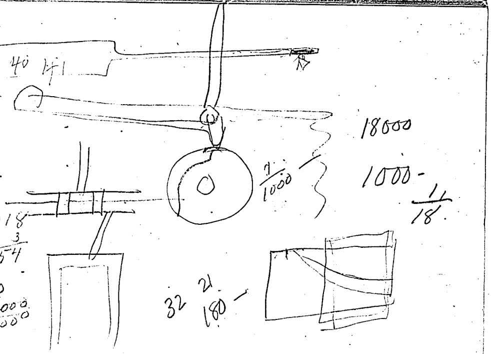
200 Rev min
1000 lbs cut
$\frac{1}{20}$ of cut friction
6" per Rev 200 Rev
100 ft per min

5000 ft lbs
625 ft "

~~50~~
12) 150 (12.5
12 0
3
2 40
6

12.5 ft min
50
50
625

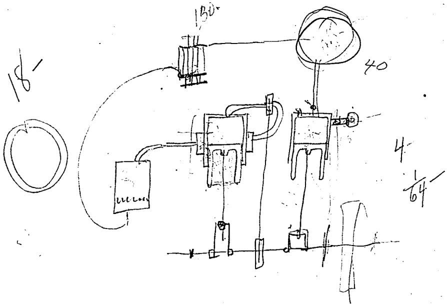
625) 5000 (8.
5000


40 141
1/1000
32
21
180 -

6000
3
18000
6018
3
18054
6000
6000
36000000

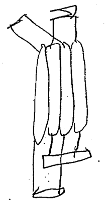
18000

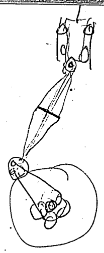
1000 - 1/18



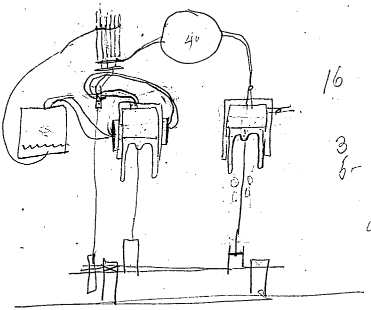
4
1/64

15
25
120
30
2250
150
2100
4200
63000



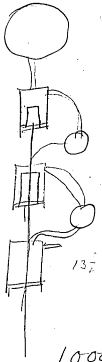


150-



16

3
5-



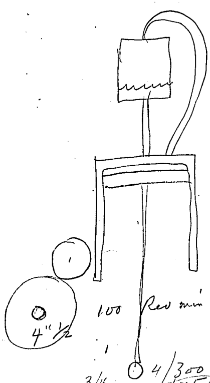
13½ lbs.

$\frac{1}{20}$ coeff—

1000 lbs—

200 Red

2" 100 ft min =
50 drag
5000 ft lbs!



100 Red min

1

3/4

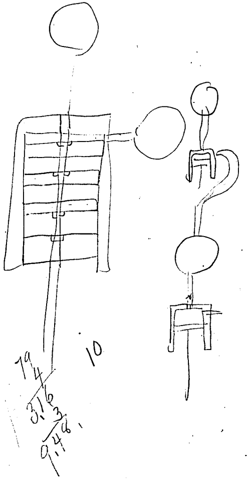
4/300
12/75 (6—

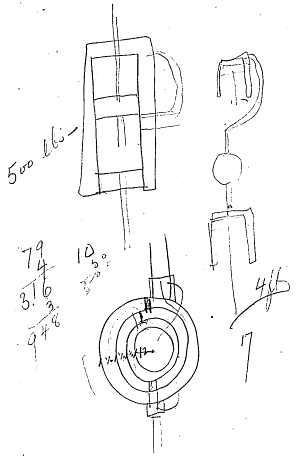
100
50
5000

50
6
300—

3000
3000

16-times less


79
4
3.16
3
0.46
10


500 lbs
79
4
3.16
3
0.48
10
4lb
17

165
133
32

361
196
165

145
109
36

628
361
2)267
133.5

5 - 0196 - 165 - 145
10 0361 . x32 x34
20 0624 1335 - 109 34
40 .1032 101 32 73
80 1599 70 48

1032
624
4)404
101

1599
1032
567
70

333
~~587~~
145

551
333
2)218
109

843
551
4)292
73

149/6710

1.5
67
82

18
1.64
82

36

8 Cubic ft min

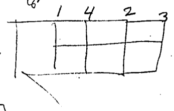
.82 of Hp not cooled

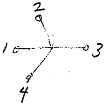
67 calculated compensate

28
5
140

1728 (12.3
1400
280.0
3288
24

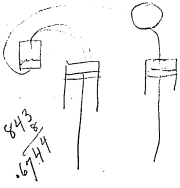
A .1032
8
8256





1195
843
5)352
48

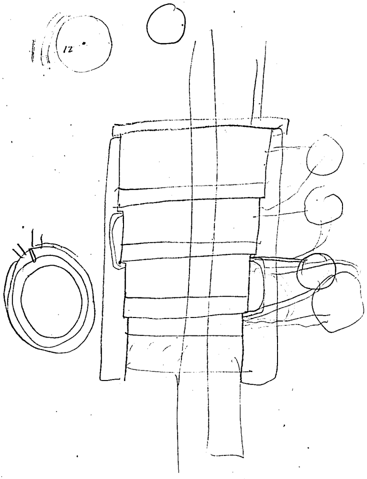
B

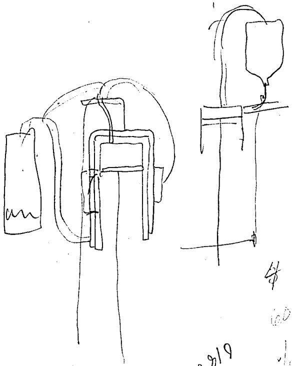


.10 Hp

843
8
.6744

315
83
40)232
600





8819

2

280

180

$$16\overset{\displaystyle 28}{\overline{)\,208}}\left(13''\right.$$

16

48

16

60 —

4 / 100000 —
25000 —
60
150 / 15000000 (10

7

2545
60
152700

1000
225

15000 —
10
900
9000 —

4 / 13 —
3

3 lbs water
500 deg
3

7500 — 9000 — 1672 / 147
73

225 / 400000 (1770
225
1750
1775
1575
1750

12 / 1770 (147
12
57
48
9

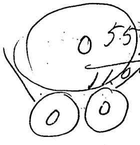
16% — dummy

2500

9000 —
2500
6500

.774 / 33000 (40.
2296
978

60
2400



0 550 / 2% / 1100 amperes –

0025

444
55
2220
2220
244.20

25)1000(4

444

55

100

5

550 Mil amp

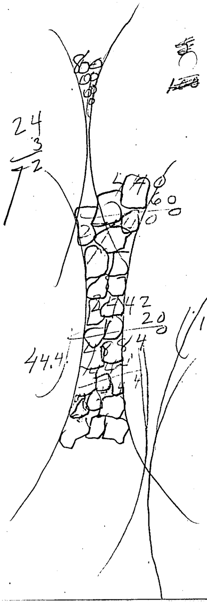
25
5
125 – on 97/100 of ohm

or 24.42 ft lbs

loss 2½ per cent –

20 cells 11 amperes –

2½ 1/1000 of ohm –


24
3
72
440
60
00
2442
20
484
4
44.4
1/10

520000
8
416000

16)172 800(10800
16
128
128

6

70-bbls-

16
12
32
16
192

28
3
84-

3 tons
400)28000(70

1200
12
2400
1200
14412
2880
1440

1728)172800(100
1728
192

6)96 tons
16-

8 tons

480
400
2080)192000(96
18000
120081

1728)10800(6,25
10368
4326
3456
8640

C

96
45
141

130
625
650
650
260
780
81215

62
3
186

45 tons at 1/4

H

1/16 812 lbs 22½ 120 bbls
1/8 1624 " 45 ton 240
1/4 3248 96 ton 480 bbls
3/8 4872 - 141 - 720-
1/2 spcld

11¼
22½
45
96

12 ft dia - 1 ft thick

6 Hp -

144
80
115,20

1200
160
72000
1200
192000

20 ft dia

40,000 -

115 -
460
6900
460
52900

320
480
25600
1280
153,600

20
8
160

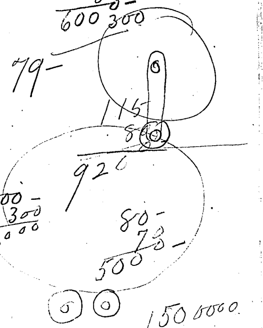
20

20
20
400
80
32000

75 -
80 -
600 300

79 -

1



115
80

920

5000 -
300
1,500,000

80 -
70 -
5000

150 0000

33000) 1500000 (4
132000
18

50% $\frac{1}{1000}$ mesh

15 — 500 mesh 1.900 000 2/1000 8
15 200 120 000 5/1000 125
15 100 10 000 10/1000 1000
5 80 1 000 12/1000 1728

52 million —

all $\frac{1}{1000}$ 100 million —
50% — 50 "

120,000

8/15 1.9

144 12 288 144 8 12

125/15 000 999/12 125 0 25 0 25 0

110 = 79
110
79 -

79 0
86 9 45 0
434 5 0
347 6 0
391 8 0
14 2 5 0
39105 - 376 25
900
360
45

||||||||||||||

110
3
330 -

3

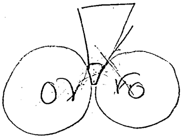
79
4
316

450 -
330
1350
1350
1485

60

60

120



79
5000
5

79
50
2) 335
1675
24
6700
3350
1020

418
60
2000) 25080 (12.5
20000
5080
40000
10800

1/32

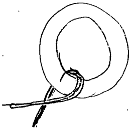
114 1/8

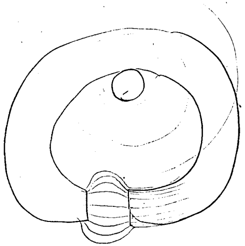
33000) 3762500
33000
46250
33000
13250
1325

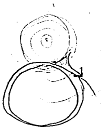
135
31
135
405
1200 4185

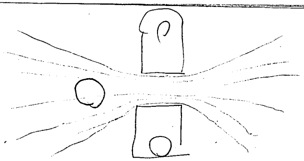
32
12
64
32
384

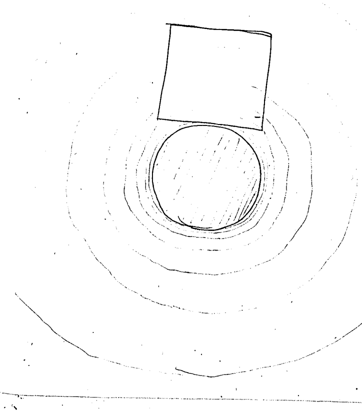
384) 1200 (3.1
1152
480

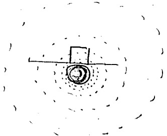


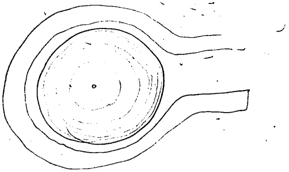


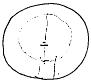


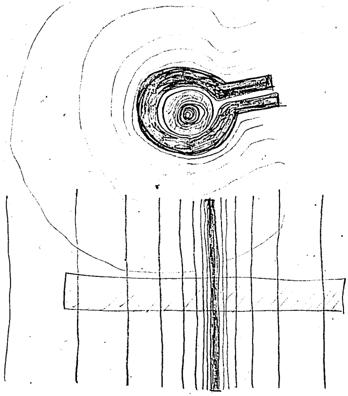


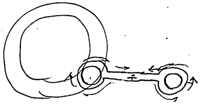


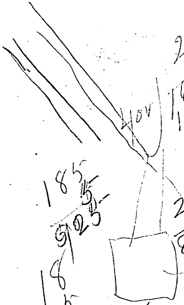












28
600
16800 (42
16000
400

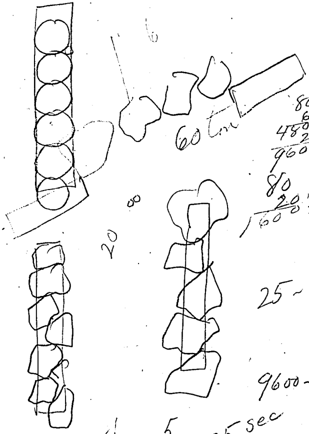
600
4
2/1000

185
5
925
18
5
8
20

28
3
84

480
28
3840
960
1 minute — 960
13440 (33
12000
1440

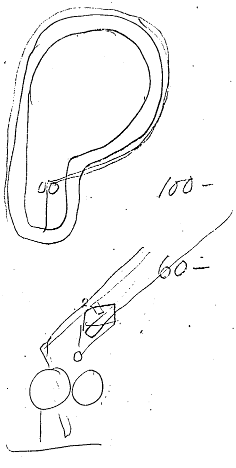
2800
2000
60)36000 400

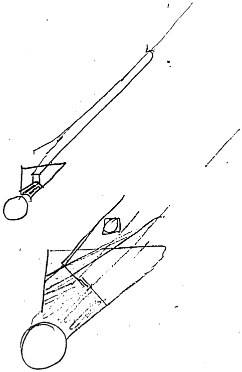


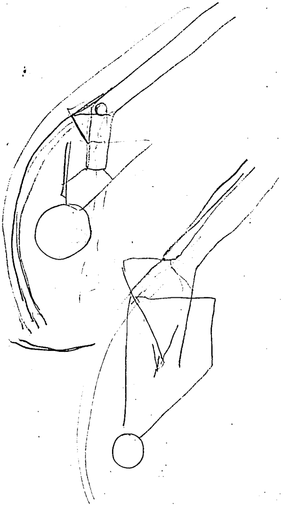
6
60 tm
80
6
480
20
9600
80
20
1600
20
00
25
9600
28
5
25 sec

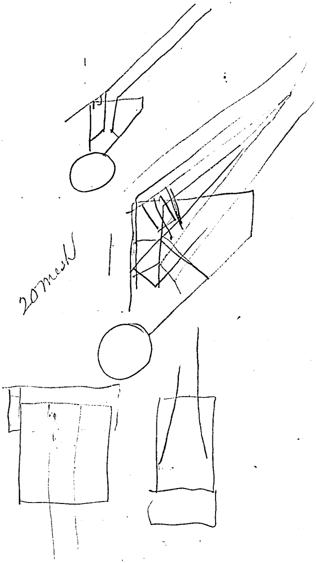
2800 lbs

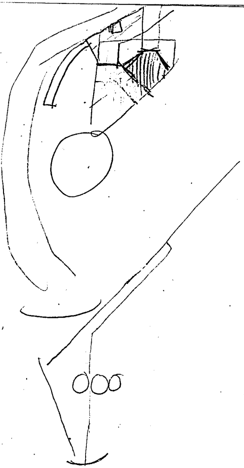
28
3
84.
2000
60) 168,000 (2800
120
480
480

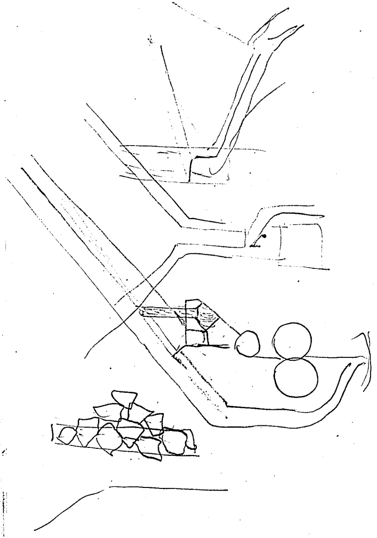


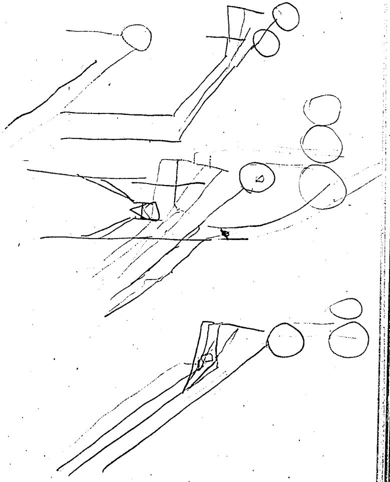


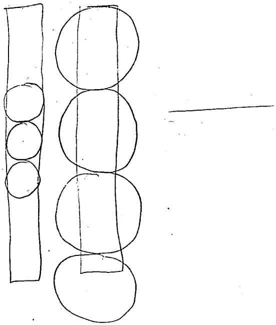


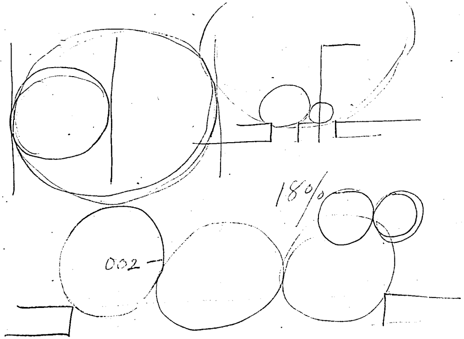

20mesh



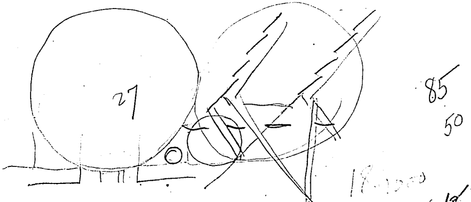








18%
002



18,000

1.2

1.2

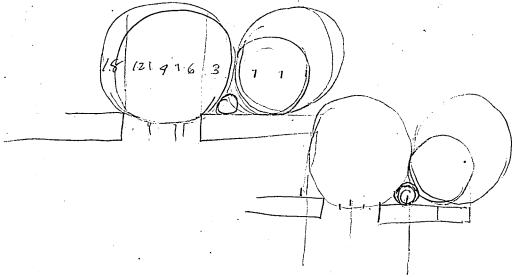
1.5
4
90

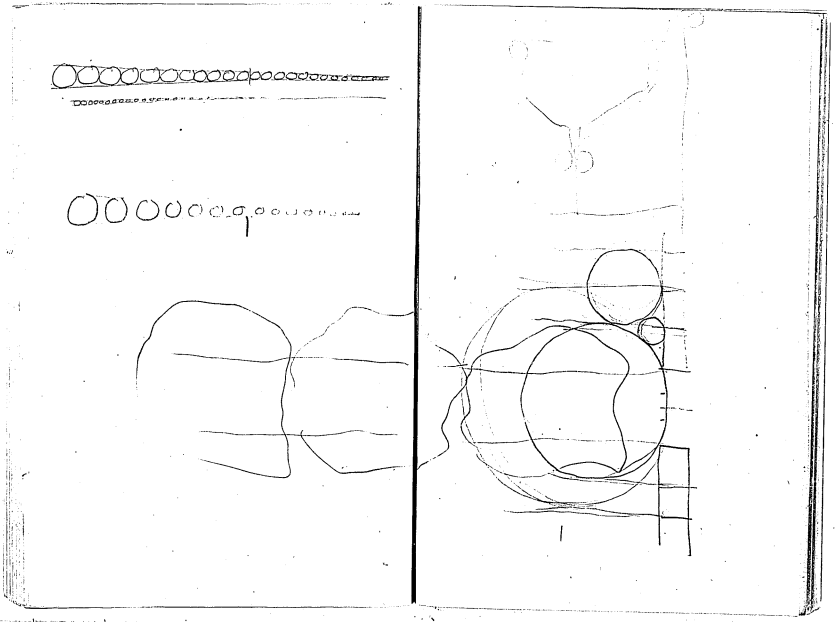
80
4
320
400
1280

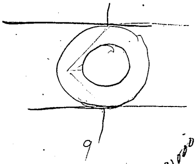
1000-

480-

480) 40000 (83
3840
1600
1440


1.8
121 9 1.6
3
1 1



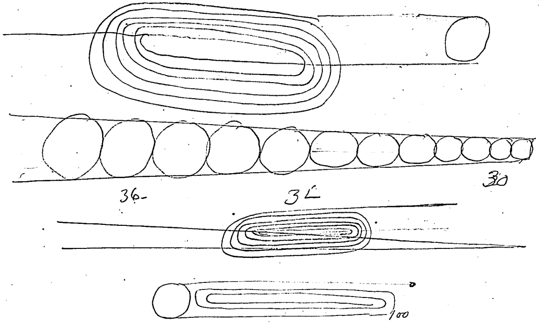


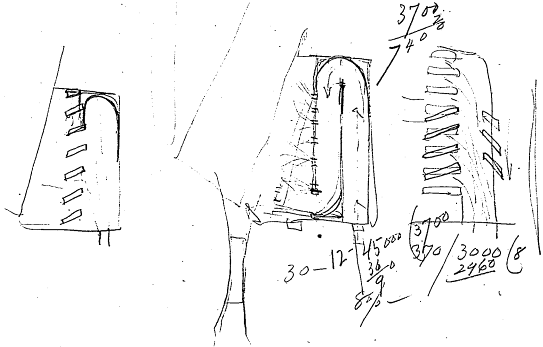
91000-

5056
75
25280
35392
379200
2 | 3792
1896

1896
24
7584
3792
45504
2 | 50.56
2528
36
15168
7584
91008
45504
460

64
79
576
448
5056





3700 / 8

740

30 — 12 — 45000

360

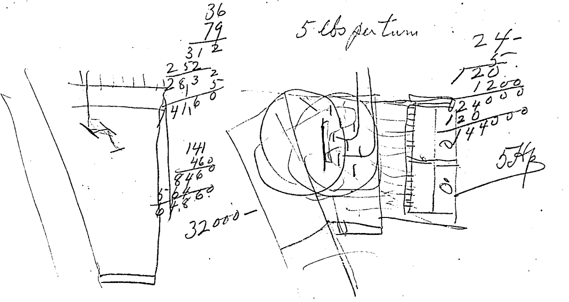
9

8/0 —

3700

370 / 3000 (8

2460



36

79

312

252

2835

4160

141

460

8460

5640

64860

32000 —

5 lbs per turn

24 —

5

120

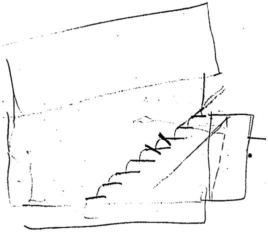
1200

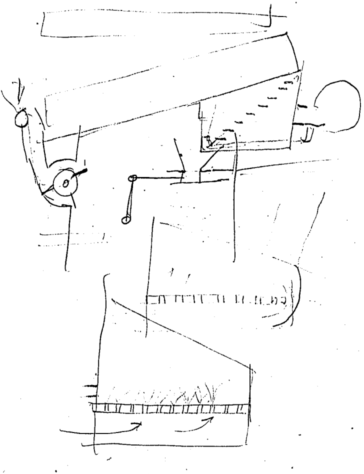
24000

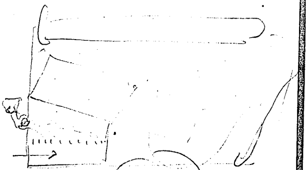
120

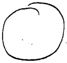
144000

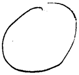
5 Hp









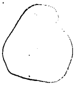


CuO Zn

KO + IK solution

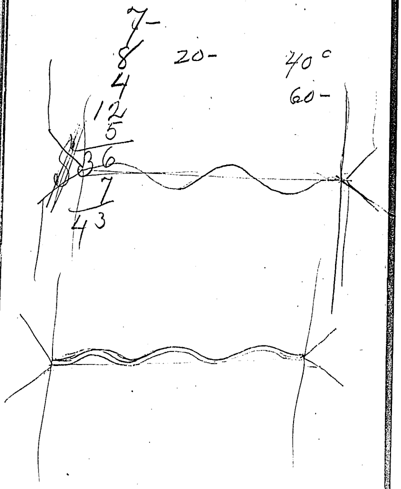
Strange When Cupric Salt

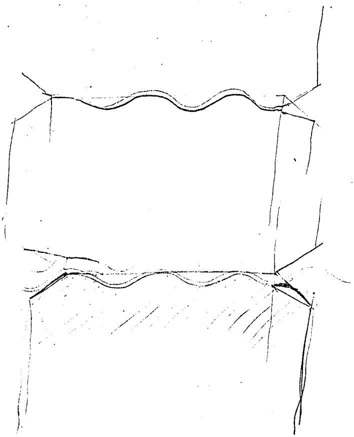
boiling add drop by drop Kalosh
anhydrous black Cu pp

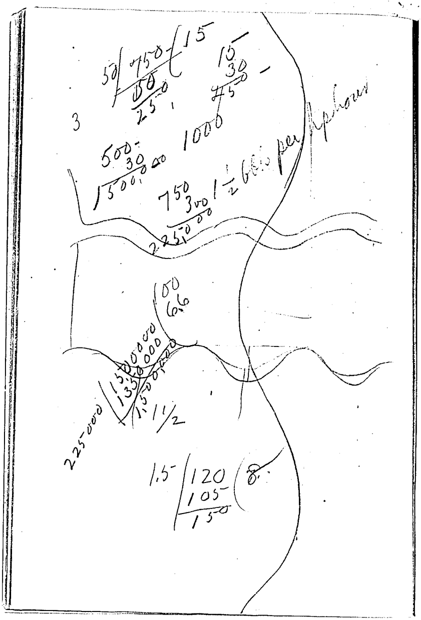


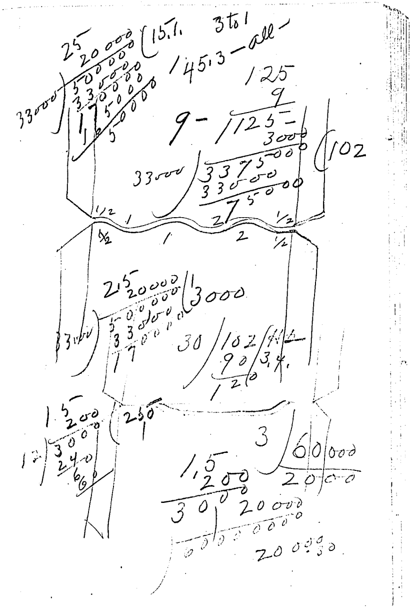
Try KCy – strong

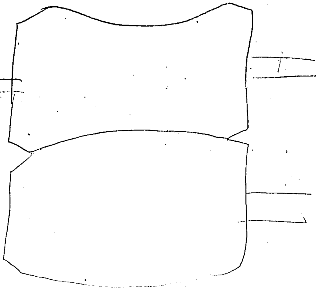
CuO not attacked


7-
8
4
12
5
36
7
43
20-
40°
60-

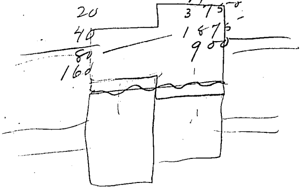



3
50/750 (15
150
250
15
30
450
500
30
15000,00
1000
750
300
225000
1½ bbls per
100
6.6
1500000
1350000
150000
225000
1½
1.5 120 (8
105
150


25
20000 (15.1.
3 to 1
145.3 — all —
125
9
33000
500000
330000
175000
9 — 1125
3000
33000
337500
330000
7500 (102
½
1
2
½
2.5
20000 (3000
33000
500000
330000
170000
30
102
90
3.4
120
1.5
200 (250
12
3000
240
60
3
60000
20000
1.5
200
3000
20000
600000
200000

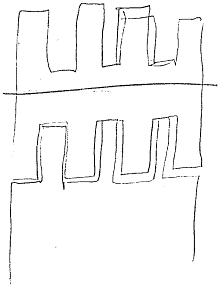


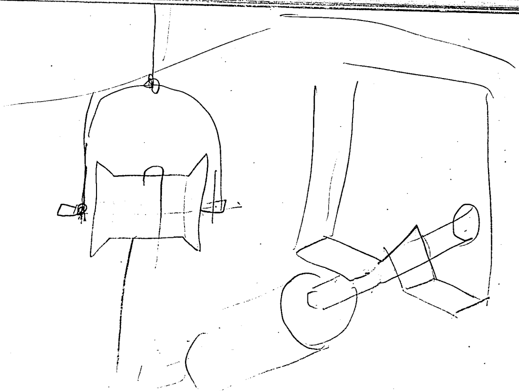
2 1/2 60 m
5 30
10 15
20 7,5
40 3,75
80 1875
160 900

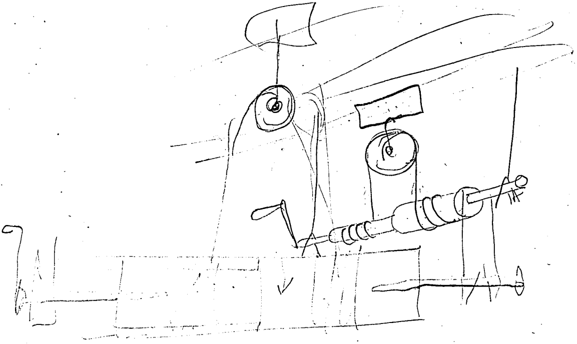


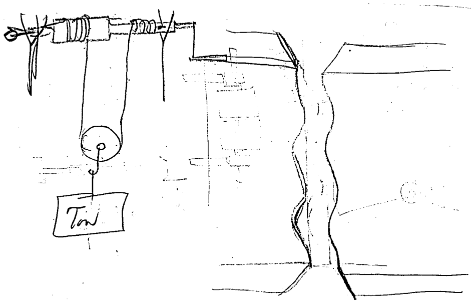
60

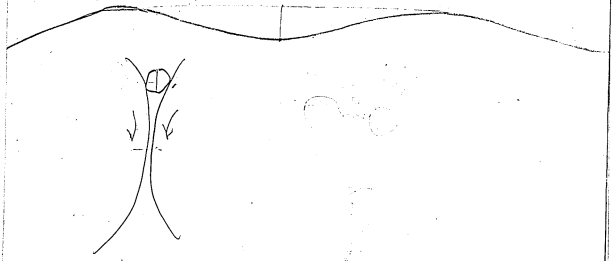
2,5 m

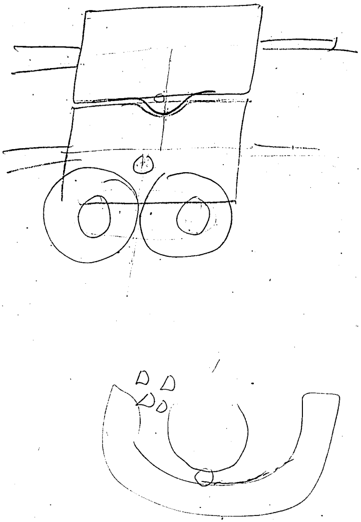


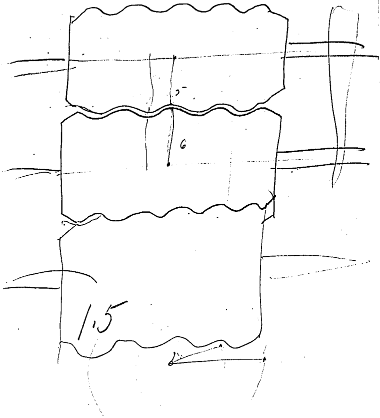


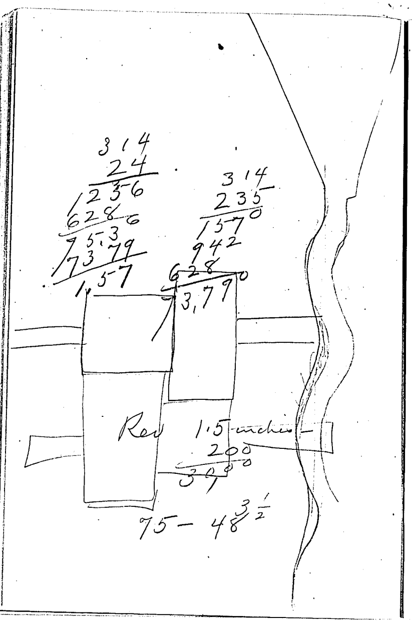



Ton






6
1.5

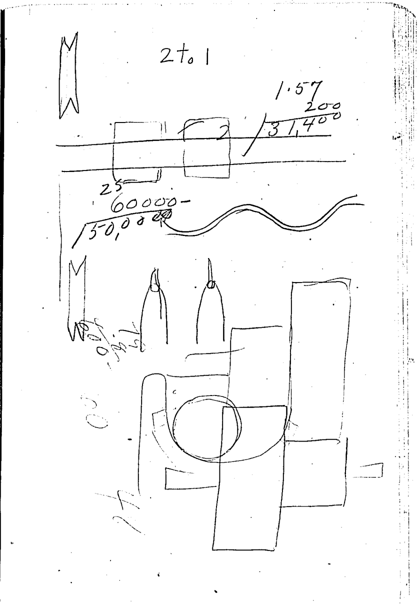


314
24
1256
628
75.36
73.79
1.57

314
235
1570
942
628
3,779

Rev 1.5 inches
200
300

75 – 48 3½



2 to 1

1.57
200
31,400

2

25
60000-
50,000

48-00
17 76
6576-
1872
8448

18720 (22
16896
1824
246-
624

6

624
1872
2496

22%=

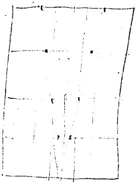
65

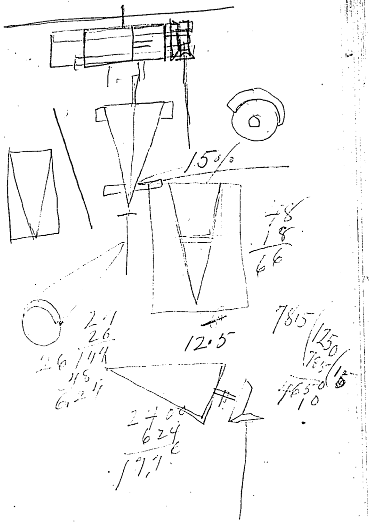
60- 3-
40,000-
2 4000

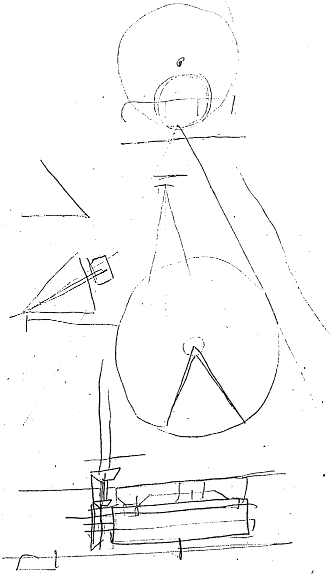
6576
2496
9072) 24960 (2.75
18144
68164
63504
4656

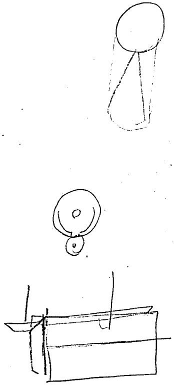
36000-

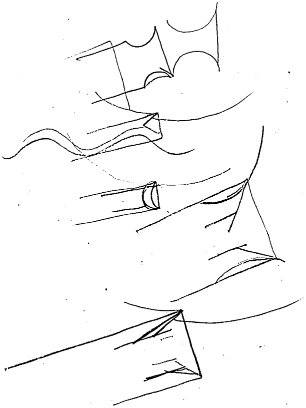
17 2/15
400
6800
30000-
3200-

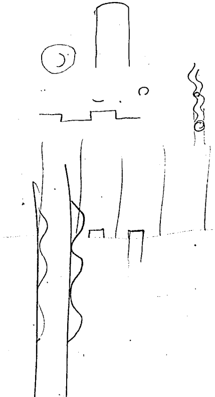


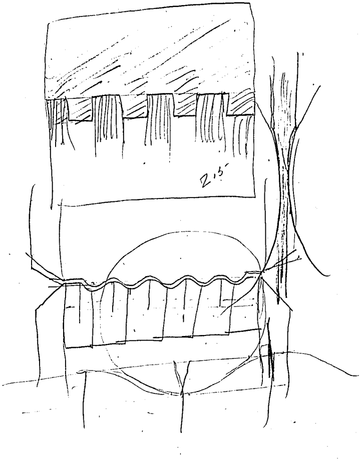

15%
7.8
1.8
66
12.5
2.4
26
144
48
624
2400
624
1776
785)1250(1
785
4650
10

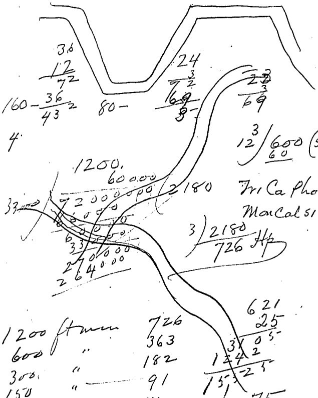












36
12
72

160 - 36
43 2

80 -

24
3
72
69
3

22
3
69

4

12 3) 600 (50
60

1200.
60000
72000000 (2180

33000

6
33
270000
264000

Tri Ca Phos
Mon Cal si -

3) 2180
726 Hp

621
25
3105
1242
15525

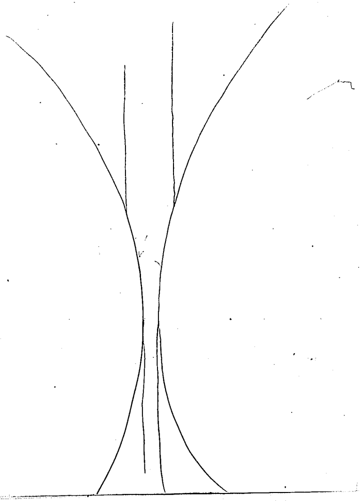
75

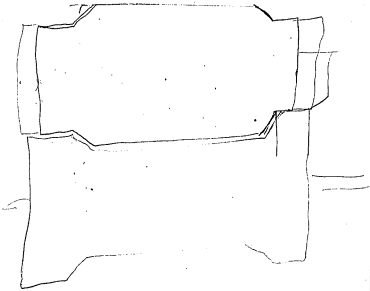
1200 ft mun		726
600	"	363
300	"	91
150	"	46
75	"	
37	"	

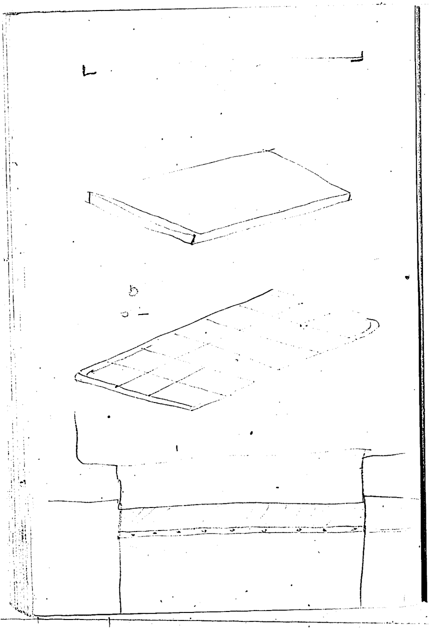
182

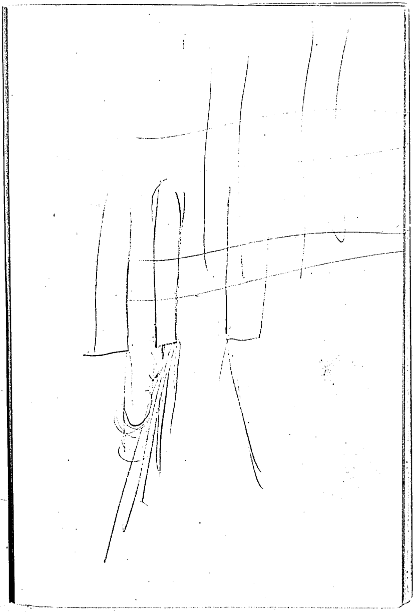
37) 230 (.621
222
80
74
60

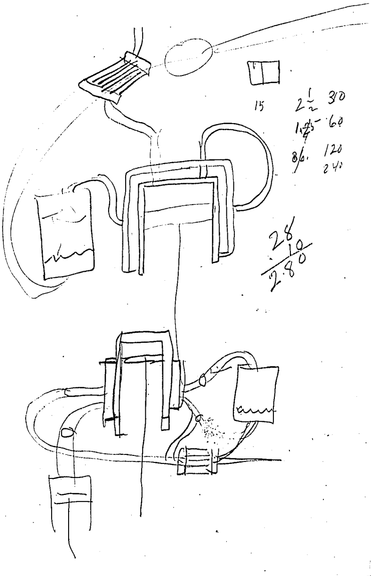
432) 160000 (370
1296
3040
3024
160






b
a




15
2 1/2 30
1.75 60
8/6. 120
240
28
10
280

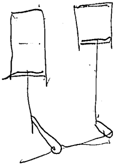
62
25
310
124
1550

160/1728 (10,8
160
1280

28
62
56
168
1736

18
12
36
18
216.

108
28
2/36
10/6,8



10.5 Cubic 88 lb

618
48
3 2721

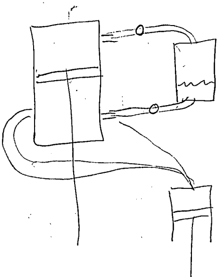
1/4 –

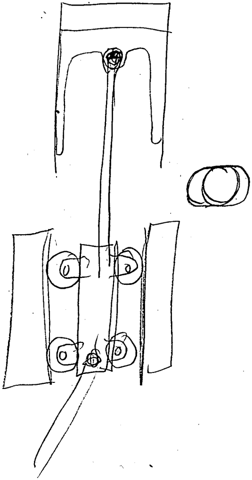
1

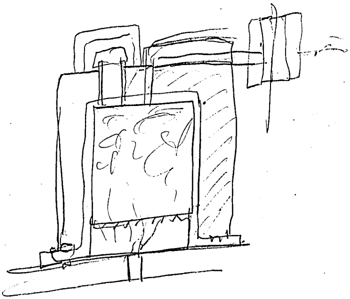
4/300
75 inches

36
8
288

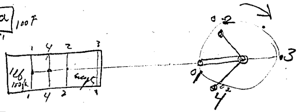
36/290 (1/8
288
36 –





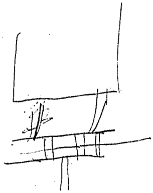


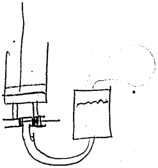
$\boxed{a}$ 100F
T_1

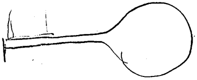

1
4
2
3
12lb
1
4
2
3
0
1
2
3
4
2

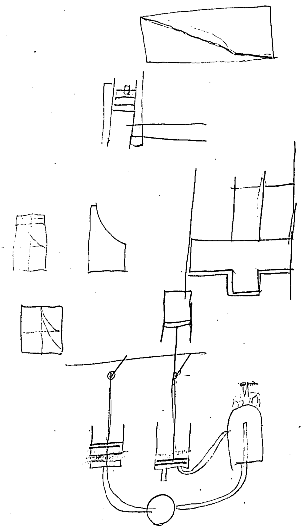
$\boxed{B}$ T_3

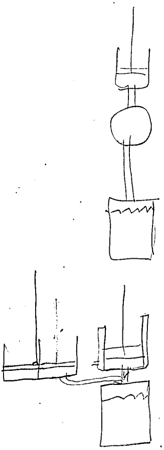
11" position pres Val + Temp Equals 1











414 Tons '475 Hp

150
35

500

3150

15000

15 tons hour

5)53000
10600

10

30

128

79
2)395
1975
24
7900
395
46400

33840
6000

2000

15)800000 (53300

64
79
256
448
4736

10

1000

8

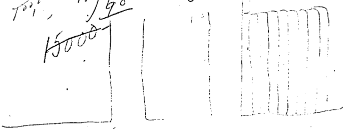
12000

16)96000 (6000

47
40
2)1880
940
36
564
2820
33840

500
700

30
15)9000000 (600,000



1300

1000
15)4000000 (266,666
30
100
90
100
90
100
90
100
90
100

266600
5
3,33000

20)266600 (13330
20
66
60
60
60
60

266000 =

4 million

60 20000

300
60
18000
7200

90
9
810 —

30

35

810 —
12
1620
810
9720
(164 8)112
28 – two to 1/16 =

1728
16)112(7 – 110
112
169
990
1690
1100
169
1699
1839
6600
1109
1851

18590 lbs 1 inch
9245 1/2
4622 1/4

4)1200
12)300(25
240
60

150
25
750
300
375

3750
60
225000 (112 195
20000
25000
20000
5000

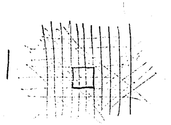
150 lbs

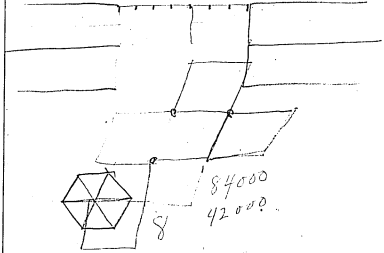
315
63
630
69
60
4140

13800 (69
12000
18000
1890
1953

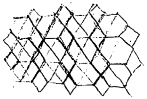
2)1336
668 – 5/8

1 Hp





2800
14
5
70



26)930(357
78
150
130
100

150 - 400 (26
300
1000

22-24)800(33
72
80

33
5
165

28
3
84 - く

24)2240(9
216
80

England
England

24 Tone Engineering

24)5-50 (2-38

78
220

25 CC

$75 pair –

75
20
1500
6
9000. | 75000 (.83
72000
3000

28
3
84 –

15000
5
75000

125 75 – 7

1c

5) 7500
1500
6
9000 –

24
24
96
48
6
57.600
4608
1

1840
2
36.80
2
73.60

461
15
2305
461
1725) 6915 (4.
6902
1310
11

460
4
1840 –

20 15-006
7 003

10 000
40 000
30 000
25 000

.800

800-
3200

2000
5500
5000

1200
1800
1350
1125

25
60
1500

25

2 — 8c
4 —

10 000, 120 m 1200

12.5
500

250c

40 000.

45
25
225
90
1125

25
40
1000

15

7

12
20
24

126

450
40
1800

22

50
30c
12
75

4.5
30
735

12
25
240
30

132
264

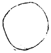
172c) 62880
780

1728) 50304 (29
3456
15744
15552

5) 18000
3600

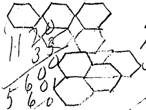
480
29
4320
960
9920
13915

160 —

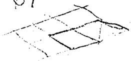


9600
6920
13920
2081

208
392
75
675



1120
33
5600
5600
3360
392
392



5240
80

80)10480 (1310
80
248
240
80
80 5

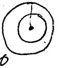
1310 ft

1 ft — 80 ft — 4 ft needle
2 160

600 ft —

1100 - 6" 1 ft $1\frac{1}{2}$ deg
2 6
4 - 24 —

5240 · 137
120
10480
5240
54 ft needle
150
685
137
240 deg



137 | 20800 (15
137
715
685
1 ft mag

20 ft
6 40
62880 $1\frac{1}{2}$ — 80

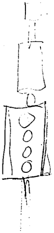
5240
48 · 262000
5

62500
4
250000 (2083 1/3
24
100
96
40
4 360
4

137 | 260000 (1170
137
1230
137
939
959

4 ft needle

5240
12
10480
5240
62880



15–25% assay

3½ ton m

35

15

175

50 ton - a

35

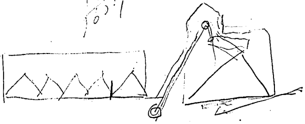
50.5) 200 (

5.25

40

40%

10%



Heat Bldgs & oil System	3800
for Elevators	4500
Big Loco –	3600
	[illegible]
25 Houses –	12000
50 Smaller	800
Furnish Machine Shop –	
Carried —	22855 –
	50705

75000

1600
280
128000
3200000
448000

68
7
476
60
416

20

400 –

12 Heavy roll shells 2200
Taking out shafts - 200
Grooving shafts — 80
New oil casings - 125-
& fixing bearings - 200
assembling rolls

150-
New plates 1st 36 - 400-
Fixing Cranes -
New wheels 1200
Scrapers - 1200 -
& shafts — 4000
4+5 belts - 2000
Roller bearings 8+4 -
Change chutes 6000
Separators 2 stock H - 1500
fix mixers — 2000
Ore dock elevator 1500
Sand House 500
Shaker Dryer 1 -
Bldg - 13H2 800

22855

9039-
2
18078

180
12
360
180
2160

Jury

144
80
11520
36
690
67
3450
414

22
460
1320
880
10120
10081
90037

36
36
216
108
1296
12980
10368

1036
36
6216
3108
37296 (21,6
34566
3456
2738
1728
10080

1734) 4140 (2.35
3468
6720
5202

1728

235-
460
14100
940
10810

at 2000 lbs pressure 10 lbs free air in
one foot = burns .16 lbs coal —
[illegible] feet – burns 12 lbs Coal –

6 ' = [illegible] –
4000
2000
4000
5000
2500

30 lbs
15
7½
3.65
1.14

M [illegible] 1 lb

60 Cubic feet
068 off [illegible]

200 lbs press
14 cft free air in 1
or say 1 lb
at 2000 lbs
10 lbs air —

140
14000
560000
140
1960000
1568000

1000000
1600000
2600000

35

40
12000
480000
384

68)1000(14
680
320
272

50
12000
600000
600000
4800000

3,500,000

1 940,000
1 000 000
1 340 000
1 850 000
1 000 000
6 030 000
2 600 000
3 430 000